

Population Ecology Graph Worksheet Questions and Answers PDF

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Part 1: Building a Foundation

What is the primary focus of population ecology?

Hint: Consider what population ecology studies.

- Individual organisms
- Communities of different species
- Populations of a single species ✓**
- Ecosystems as a whole

■ The primary focus of population ecology is on populations of a single species.

Which of the following are considered biotic factors affecting population size? (Select all that apply)

Hint: Think about living factors that influence populations.

- Predation ✓**
- Climate
- Competition ✓**
- Natural disasters

■ Biotic factors include predation and competition.

Explain the concept of carrying capacity and its significance in population ecology.

Hint: Consider how resources limit population growth.

Carrying capacity is the maximum population size that an environment can sustain, and it is significant because it determines the population dynamics and health of ecosystems.

List the phases of a logistic growth curve and provide a brief description of each phase.

Hint: Think about the stages of population growth.

1. Lag phase

The initial phase where the population is small and growth is slow.

2. Exponential growth phase

The phase where the population grows rapidly due to abundant resources.

3. Stationary phase

The phase where the population size stabilizes as resources become limited.

4. Decline phase

The phase where the population decreases due to resource depletion or other factors.

The phases include lag phase, exponential growth phase, stationary phase, and decline phase, each representing different growth dynamics.

Part 2: Understanding and Interpretation

In a logistic growth model, what happens when a population reaches its carrying capacity?

Hint: Consider the implications of resource limitations.

- The population continues to grow exponentially.
- The population size stabilizes. ✓**
- The population size decreases rapidly.
- The population becomes extinct.

When a population reaches its carrying capacity, the population size stabilizes.

Which factors can lead to changes in carrying capacity? (Select all that apply)

Hint: Think about both biotic and abiotic influences.

- Availability of resources ✓**
- Predation rates ✓**
- Climate change ✓**
- Birth rates ✓**

Factors that can lead to changes in carrying capacity include availability of resources, predation rates, climate change, and birth rates.

Describe how density-dependent factors differ from density-independent factors in regulating population size.

Hint: Consider how population density influences these factors.

Density-dependent factors are influenced by population density, such as competition and predation, while density-independent factors affect population size regardless of density, such as natural disasters.

Part 3: Application and Analysis

If a population of rabbits in a forest experiences a sudden increase in predators, what is the likely immediate effect on the rabbit population?

Hint: Think about the impact of predation on population dynamics.

- Increase in population size
- Decrease in population size ✓
- No change in population size
- Population becomes extinct

The likely immediate effect on the rabbit population would be a decrease in population size.

Which of the following scenarios demonstrate density-dependent regulation? (Select all that apply)

Hint: Consider how population density affects these scenarios.

- A drought reduces water availability for all organisms.
- A disease spreads more rapidly in a densely populated area. ✓
- A hurricane destroys habitats regardless of population size.
- Increased competition for food as population size grows. ✓

Scenarios that demonstrate density-dependent regulation include disease spread in dense populations and increased competition for food.

Predict how an increase in human population might affect the carrying capacity of a local ecosystem.

Hint: Consider the impact of human activities on resources.

An increase in human population may decrease the carrying capacity of a local ecosystem due to increased resource consumption and habitat destruction.

Part 4: Evaluation and Creation

Which phase of the logistic growth curve is characterized by the fastest population growth?

Hint: Think about the stages of growth in a population.

- Lag phase
- Exponential growth phase ✓**
- Stationary phase
- Decline phase

The phase characterized by the fastest population growth is the exponential growth phase.

Analyze the following scenarios and identify which are likely to cause a population bottleneck. (Select all that apply)

Hint: Consider events that drastically reduce population size.

- A new predator is introduced to the environment. ✓**
- A severe storm reduces the population drastically. ✓**
- A disease outbreak affects only a small portion of the population.
- A significant portion of the habitat is destroyed by human activity. ✓**

Scenarios likely to cause a population bottleneck include the introduction of a new predator and severe storms that drastically reduce population size.

Analyze how immigration and emigration can alter the genetic diversity of a population.

Hint: Consider the effects of gene flow between populations.

Immigration can increase genetic diversity by introducing new alleles, while emigration can decrease diversity by removing individuals and their genetic contributions.

Which strategy is most effective for managing an endangered species population?

Hint: Think about conservation methods.

- Increasing hunting quotas
- Habitat restoration and protection ✓**
- Introducing more predators
- Allowin natural selection to take its course

The most effective strategy for managing an endangered species population is habitat restoration and protection.

Evaluate the following conservation strategies and identify which are likely to enhance biodiversity. (Select all that apply)

Hint: Consider strategies that promote diverse ecosystems.

- Establishin protected areas ✓**
- Implementin sustainable resource management ✓**
- Promoting monoculture farming
- Restoring natural habitats ✓**

Strategies likely to enhance biodiversity include establishing protected areas, implementing sustainable resource management, and restoring natural habitats.

Propose a conservation plan for a declining fish population in a freshwater lake, considering factors such as carrying capacity, human impact, and ecological balance.

Hint: Think about sustainable practices and community involvement.

A conservation plan should address habitat protection, sustainable fishing practices, and community education to balance human impact and ecological health.